



## CT DEP Fact Sheet

*Produced July 2004, revised 2005*

# Outdoor Wood Burning Furnaces

## What are Outdoor Wood Burning Furnaces?

An outdoor wood burning furnace, or OWF, is essentially a wood-fired boiler in a small, insulated shed with a smoke stack. OWFs heat water that is carried through underground pipes to heat a home or building, domestic hot water, a swimming pool, a Jacuzzi or a hot tub. Please note that Public Act 05-227 specifies new requirements for the installation and operation of all OWFs installed after July 11<sup>th</sup> 2005. See also DEP fact sheet entitled Public Act 05-227 and Outdoor Wood Burning Furnaces.

## Are OWFs Harmful to the Environment and Human Health?

Yes, OWFs produce a lot of thick smoke, which in addition to being a nuisance to neighbors has serious health and air pollution impacts. Smoke from OWFs contains unhealthy amounts of particulate matter (PM), dioxin, carbon monoxide, nitrogen dioxide, sulfur dioxide, hydrochloric acid, formaldehyde and other toxic air pollutants.

Exposure to PM in smoke from an OWF can increase adverse respiratory and cardiovascular symptoms. Exposure to other pollutants listed above is associated with a diverse range of harmful health effects, including asthmatic sensitivity, lung illnesses and cancer. Studies show that children, the elderly and individuals with pre-existing cardio-respiratory diseases or diabetes are most at risk.



While OWFs are advertised to burn wood, owners sometimes add yard waste, packing materials, construction debris -- even household garbage and tires. Burning these other substances in an OWF is both illegal and produces additional toxic and hazardous air pollutants.

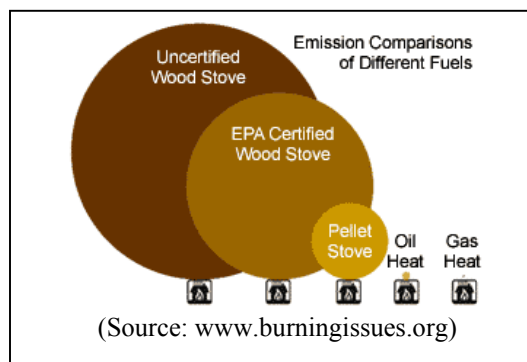
The federal government requires indoor wood stoves to meet air pollution standards, however no such standards are required for OWFs. In Connecticut, the CT DEP requires the smoke from combustion sources including OWFs to meet strict opacity limits. Failure to meet these limits could result in fines and other enforcement actions. The CT DEP is unaware of any

currently manufactured OWFs that are capable of being operated in full compliance with Connecticut's regulatory standards. Be aware that some manufacturers of OWFs are making inaccurate claims about their product's environmental benefit and efficiency.

## How High are Emissions Levels from OWFs?

While there is only limited data at this time, it is known that PM emissions from OWFs are very high. One study showed emissions to be significantly higher than indoor wood stoves that are regulated by federal standards. Such high emissions result from low efficiency and incomplete burning of fuel. The CT DEP compared emissions from homes heated with natural gas (the cleanest option), oil, and OWFs.

Emissions from a conventional oil furnace are approximately equal to emissions from 39 homes using gas. If an EPA certified indoor wood stove were to be used to produce the same amount of heat, the PM emissions would equal 2000 homes heated by natural gas. In contrast, the emissions of one OWF to heat a home equals 3,000 to 8,000 homes being heated with natural gas.



## Why do OWFs produce so much unhealthy smoke?

The basic design causes fuel to burn incompletely. OWF systems consist of a single closed combustion chamber, or firebox, that is surrounded by a water jacket. Since wood cannot be combusted completely at temperatures below 1000°F, the steel firebox surfaces backed up by water at 150°F chill and quench the flames before combustion is complete. As a result, smoke is produced. The smoke and combustion products are vented through a smokestack directly to the outside air.

Another reason why OWFs produce smoke is the operation during "off" cycles. When an OWF does not need to generate heat, the combustion air fan is turned off and/or the air damper closes, thereby starving the fire for air. The fire then smolders, creating smoke and creosote that condenses on the cold steel internal surfaces. When heat needs to be produced, the air dampers open and/or a small fan forces combustion air into the firebox, thereby pushing the smoke and air pollutants out the stack.

## What's Being Done and What Can You Do?



Throughout New England, state regulatory agencies have received numerous complaints about OWFs. The CT DEP is working with NESCAUM (Northeast States for Coordinated Air Use Management) and other states to encourage the US EPA to establish adequate national uniform testing methods and comprehensive national regulatory emission standards for OWFs. Due to the increasing number of complaints, some municipalities are investigating the establishment of bans.

Before buying an OWF, you should consider the resulting health and environmental impacts to your family and neighbors, and the nuisance you could create. Keep in mind that OWFs operated in Connecticut are very likely to violate long-standing DEP regulations that require all fuel burning sources to meet standards for opacity (smoke) and odors. The DEP may take enforcement actions against the owner/ operator of the OWF for non-compliance. Owner/operators may also be subject to private lawsuits from affected neighbors. After considering your needs and the alternatives, you may choose to use a different and perhaps cleaner, more efficient heating system. One alternative may be an indoor wood stove; the U.S. Environmental Protection Agency requires all indoor wood stoves manufactured after the late 1980s to be certified to meet air emissions standards. If you still chose to buy an OWF, burn only recommended wood fuel, set the unit as close to your home as possible and make sure that the smokestack is higher than your house and your neighbor's.

## For More Information

The CT DEP operates an **Air Pollution Complaint Line at 860-424-3436**. This line is open to all citizens with concerns regarding smoke and other air pollution. It is operated from 8:00 am - 4:30 pm, Monday through Friday; voice mail is available for complaints made during evening and weekend hours or you can e-mail a complaint to [dep.aircomplaints@po.state.ct.us](mailto:dep.aircomplaints@po.state.ct.us).